



# Year 2001 Progress Report of Activities

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New Mexico Plant Materials Center

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## Who We Are

The New Mexico Plant Materials Center (NMPMC) is one of 26 Plant Materials Centers operated by the USDA Natural Resources Conservation Service (NRCS). Areas served by the NMPMC include New Mexico, Arizona, Colorado, and Utah. The NMPMC is located twenty-five miles south of Albuquerque in Los Lunas, New Mexico. It is operated in conjunction with the New Mexico State University Agricultural Science Center. The facility is located in the Middle Rio Grande Valley and includes 200+ acres of irrigated land.



New Mexico Plant Materials Center at Los Lunas, NM

## What We Do

It is our mission to develop, test and transfer effective, state-of-the-art plant science technology to meet customer and resource needs. The NMPMC targets these major land resource areas (Ecozones):

- New Mexico and Arizona mountains
- San Juan River Valley plateaus and mesas
- Southern desert basin, plains and mountains
- Southern Rock Mountains

- High intermountain valleys
- Pecos–Canadian plains and valleys
- Southern high plains

The NMPMC emphasizes using native plants to solve conservation problems. Environmental conditions including low precipitation, high intensity rainfall, wind, topography, and varied land uses combine to produce a variety of problems needing plant material solutions.

The NMPMC collects superior adapted plants for testing, selecting, and releasing to commercial growers along with seed and plant production technology. Additionally, plant establishment technologies are developed or refined that require minimal or no irrigation in the arid southwest. The following major objectives are addressed:

- Rangeland Erosion Control
- Cropland Erosion Control
- Water Quality Maintenance and Improvement
- Wildlife Habitat Improvement

The articles on the following pages provide a brief summary of Year 2001 accomplishments. For more detailed technical information, request the *Year 2001 Technical Report*.

## Annual Field Day Continues To Grow

450 people attended the 2001 Annual Field Day. As always, the activities were jointly provided by the staff of the NUFMC and the New Mexico State University Agricultural Science Center (NMSU ASC).

We provided two separate tours during a 4-hour period, with five stations on each tour. Tour stations included:

- Developing native plants for xeriscaping
- Black gram seed production
- Cottonwood and willow production

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- Alfalfa varieties
- Biting flies

As well as the NMPMC and NMSU ASC staff, local experts served as speakers. Lectures and demonstrations on refrigerator pickles, chile peppers, and the erosion power of rolling rivers were provided also. A lunch was provided for all attendees, and a local bluegrass band provided entertainment. We were very appreciative of everyone who took time to attend



**Congressman Joe Skeen (center) helps himself to lunch at the Annual Field Day.**

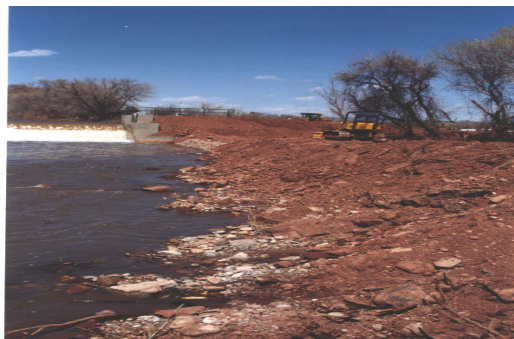
## Riparian Plant Materials Distribution

A national goal of the USDA NRCS is to restore and enhance wetland ecosystems, fish and wildlife habitats, and to improve the environmental quality of both rural and urban landscapes. To assist in this effort, the NMPMC makes available 100 riparian plant material units each year upon request to any NRCS Field Office for demonstration riparian plantings (such as stream bank stabilization) in their district. In general, riparian plantings provide a buffer by:

- Improving water quality
- Reducing the likelihood of downstream flooding
- Improving wildlife habitat
- Shading streams and lakes to reduce water temperatures for fish habitat
- Reducing atmospheric carbon dioxide by storing carbon in woody stems, branches and roots

During the past 15 years, the NMPMC has been testing riparian trees and shrubs for their ability to root from dormant pole cuttings (a rootless pole cut 10-to 15-feet in length). Through this testing process, we have found that most common riparian woody shrubs in the Middle Rio Grande Valley can be established from vigorous, rootless stem cuttings. These poles are planted into the water table where they grow roots and become established without irrigation. Without irrigation, containerized woody transplants typically die before they have a chance to become established because most of the NMPMC service areas receive less than 15 inches of annual precipitation. Irrigation is expensive and impractical in wild land plantings.

The NMPMC has approximately 20 acres of riparian plant materials in production for pole cuttings that are harvested annually for distribution purposes. We also have encouraged one commercial producer to sell rootless pole cuttings of several different species.



**March 2001–Bank of the Pecos River shaped with bulldozer after construction of a diversion dam in the village of El Pueblo.**



**August 2001–Same location with willows provide by the NMPMC and planted in April with an electric rotary hammer drill to stabilize the riverbank.**

In the year 2001, the NMPMC distributed 6,010 riparian pole cuttings or plants that were used in demonstration plantings. The participating USDA-NRCS New Mexico Field Offices include:

|             |            |                       |
|-------------|------------|-----------------------|
| Albuquerque | Espanola   | Raton                 |
| Alamagordo  | Estancia   | Roy                   |
| Artesia     | Grants     | Silver City           |
| Carrizozo   | Las Cruces | Socorro               |
| Chama       | Lordsburg  | Truth or Consequences |
| Cuba        | Los Lunas  | Tucumcari             |
| Deming      | Mora       |                       |

Other participating organizations that received riparian plant materials include:

- Army Corps Engineers
- Bosque del Apache Wildlife Refuge
- Bureau of Indian National Affairs
- Bureau of Land Management
- Bureau of Reclamation
- City of Albuquerque Open Space

- Common Ground Earthworks Institute
- New Mexico State Land Office
- Rio Grande Nature Center State Park
- San Juan Pueblo
- U.S. Fish and Wildlife Service

## NMPMC Advisory Committee Meeting

In April 2001, 45 agriculture and ecosystem reclamation specialists attended the NMPMC Advisory Committee Meeting to help identify high priority concerns to be addressed by the Plant Materials Program in New Mexico. Participants included New Mexico NRCS team leaders and state specialists, area native grass seed producers, local reclamation specialists from the mining industry and other land management specialists from federal and state agencies.

The participants were asked to identify and prioritize issues of concern for the Plant Materials Program to pursue. The highest priority issues were:

- New plant species for wind breaks on cropland
- Plant material alternatives for center pivot corner use on cropland
- High salt tolerant species for rangeland
- Planting techniques for the southern desert major land resource area
- Wetland systems for storm runoff in urban areas
- Planting techniques for large-scale riparian restoration projects

These issues have been incorporated into the NMPMC Long Range Plan. Results from the 2002 meeting will be reported in the 2002 *Progress Report of Activities*.



NMPMC Advisory Meeting April 2001  
District Conservationist Richard Spencer Facilitating

## Native Plants for Urban Customers

Master Gardeners from Valencia, Bernalillo, and Sandoval counties have joined with the NMPMC to develop native plants for ornamental use. The Master Gardeners' program is sponsored by the New Mexico State University Cooperative Extension Service. In the fall of 2000, the Master Gardeners started this project by making preliminary selections of little bluestem (*Schizachyrium scoparium*).

Little bluestem is a native, warm-season, perennial bunchgrass. It exhibits tremendous variability among accessions for foliage color, height and shape. Summer colors may vary from bright green to a dull blue-green. Fall colors vary from tan to golden to deep rust. The height of little bluestem may range from 2–4 feet, and the plant may be either erect or floppy.

The Master Gardeners studied the variability in the NMPMC's collection of 133 accession to select traits desirable for urban use. Selections were made for color and form. Plants from the preliminary selections were selected that were tall and erect or floppy in golden and rust colors. Tall plants in both colors may be used for hedges, small windbreaks or specimen plants. Shorter plants may be used as specimen plants.

The project continued in the summer of 2001 when the Master Gardeners made preliminary selections from the little bluestem nursery for summer color. The Master Gardeners and the NMPMC will continue to make selections for ornamental uses from various species currently growing in the NMPMC's nurseries.



Master Gardeners selecting little bluestem

## National Park Service Agreement

The NMPMC has a cooperative agreement with the National Park Service (NPS) to assist the NPS at several of the national parks in the NMPMC's service area. To revegetate disturbed areas in the parks (such as roadsides, trails, campgrounds, and other construction areas), the NMPMC provides the NPS with plant materials (either seed or transplants) of the parks' local, native ecotypes. This helps to reduce the potential for water and wind erosion. The NMPMC produces both seed and containerized transplants for revegetation purposes.

Currently, the NMPMC has over 5300 plants of 20 species in production for the Grand Canyon National Park. In 2001, we delivered 3795 containerized transplants of 19 different native shrub species to the Grand Canyon National Park.



## Assistance: Conservation Concerns

The NMPMC has worked directly with NRCS Field Offices and members of the Soil and Water Conservation District (SWCD) to provide assistance with the following conservation concerns:

- Wind erosion
- Increased forage on rangeland and/or cropland

Solutions to the concerns have included field windstrips, forage production studies, and range seeding demonstrations. Providing assistance for these concerns allows the NMPMC opportunities to test new plant materials and to demonstrate new planting techniques.

### Wind Erosion

Wind erosion is severe in many areas of New Mexico, and damage to seedlings is typical. In 1999, the NMPMC provided a landowner near Columbus, New Mexico with seedling transplants of an experimental variety of a native species of grass (giant sacaton). Using these transplants, we created a windstrip to help reduce the damage caused by wind erosion.

The windstrip provides two important benefits during the critical wind erosion period:

1. Establishes a barrier to protect from wind erosion.
2. Prevents soil particles from moving across the soil surface causing damage to young seedlings.

To continue helping the landowner with this project, in 2001 the NMPMC provided more transplants for a new 2000-foot windstrip adjacent to the landowner's cropland.



**Giant Sacaton Windstrip**

### Forage Production

A forage production project that began in 2000 on farmland near Silver City, New Mexico continues to show that forage triticale can be an excellent replacement for seed triticale.

Seed triticale is primarily grown for the purpose of seed production, while forage triticale is grown for forage.

A local landowner wanted to determine if the annual forage being used in his local area was the best forage

available. Typically, the annual forage used in that area (and in many parts of New Mexico) is triticale (a cross between wheat and rye). This crop is planted in the fall. It is harvested as a forage crop mechanically or by grazing. The triticale currently being used by this landowner is considered a seed-type of forage.

The landowner has agreed to continue experimenting with a forage-type of triticale using his current growing and grazing regime. The forage triticale will be evaluated against the present seed type.



**Triticale Evaluation Planting**

### Rangeland

Rangeland is a primary land resource in the NMPMC service area, and forage production of native rangeland species is crucial for landowners to maintain their livelihood.

In an area near Cliff, New Mexico, rangeland forage production along the Mangus Creek has been close to non-existent. There are no species of native rangeland vegetation present; most vegetation in the area consists of annual weeds. Through a request to the Silver City NRCS Field Office by a landowner, the NMPMC was asked to help solve this problem.

The NMPMC, in cooperation with the Silver City NRCS Field Office and the landowner, installed a small demonstration seeding in August 2001. The seeding consisted of four native grass species: sideoats grama, blue grama, galleta, and alkali sacaton. On half of the seeded area, we applied a mulching treatment to see the effect it would have on germination and survival.

In October 2001, we evaluated the seeding for germination and survival. The area without the mulching treatment had zero germination. The area with the mulching treatment had excellent germination and growth. This demonstration planting will hopefully lead to larger plantings in the area by landowners along the Mangus Creek.



**Rangeland Improvement**

### **Cane Bluestem Released**

A selected release of cane bluestem (*Bothriochloa barbinodis*), referred to as the Grant germplasm cane bluestem, was released in May 2001. USDA-NRCS Field Office personnel originally collected the Grant germplasm in 1982 from native stands in New Mexico and Arizona.

Cane bluestem is a large robust warm-season bunch grass with plants reaching heights of 1.5 to 2 meters. This grass appears to be remarkably drought tolerant and well adapted to southwestern rangeland. It has been classified as fair-to-good forage for cattle and wildlife. Under dry land conditions, cane bluestem has produced yields of approximately 4 metric tons/ha annually. When green, the total protein of cane bluestem forage is about 10%; when dormant, forage protein may drop to 4.5%. When grown under similar conditions, cane bluestem and switchgrass (*Panicum virgatum* L.) compared favorably. However under drought conditions, cane bluestem produced more forage than switchgrass.

Commercial growers have established seed production fields in New Mexico and Texas.



**Cane bluestem**

### **Bottlebrush Squirreltail Released**

Tusas germplasm bottlebrush squirreltail (*Elymus elymoides*) was released in May 2001 as a selected class of certified seed. In 1983, USDA-NRCS Field Office personnel collected 131 accessions of bottlebrush squirreltail from native stands throughout New Mexico. Eight of these accessions were selected to form the composite known as Tusas germplasm.

Bottlebrush squirreltail is a native, cool-season, short-lived perennial bunchgrass most often characterized as an early seral species. Tusas germplasm obtains a height of approximately 15-20 inches (38-50 cm) and greens-up in mid-to-late February when 'Paloma' ricegrass (*Achnatherum hymenoides*) is still dormant.



**Bottlebrush squirreltail**

Bottlebrush squirreltail is one of the most fire-resistant bunchgrasses allowing it to survive sequential burns. Its self-pollinating mode of reproduction allows it to produce seed despite sparse initial populations. These qualities along with an effective seed dispersal mechanism make it well suited for seeding following wildfire or prescribed burns. It also has the potential for aiding in the reclamation of rangelands dominated by exotic annual weeds. Studies show that bottlebrush squirreltail can compete with exotic annual grasses such as medusahead wildrye (*Taeniatherum caput-medusae*) and cheatgrass (*Bromus tectorum*). The ability to germinate and produce roots at low temperatures allows bottlebrush squirreltail to establish in areas dominated by these types of grasses.

Commercial growers have established seed production fields in Colorado and New Mexico.



## Tallpot Transplants in the Arid Southwest

In the arid southwest, irrigation typically is required to establish trees and shrubs that are commonly used for windbreaks, wildlife plantings, and stabilization of critical sites. On remote sites, irrigation can be very expensive or very time consuming when watering individual plants. The NMPMC has been developing a planting technique that utilizes transplants grown in tall-pots (containers longer than 24 inches) coupled with a single application of a cornstarch hydrogel that will provide enough moisture for one year.



**Native Shrub With 30-inch Rootball Grown in a Tallpot**

Perforated irrigation tubes 3-inches in diameter and 40-inches long that hold hydrogel are placed in planting holes before backfilling the hole.



**Perforated Irrigation Tube Containing Hydrogel**

These tubes allow the hydrogel to flow near the bottom of the rootball to encourage growth of a deeper root system. The hydrogel is sold as a powder requiring hydration. Each powder granule acts as a tiny reservoir and can absorb water at 200 times its weight. Microbial degradation of the cellulose releases free water to plants

that is available through root absorption. Randomly selected plants also have been installed that received only water as a control to compare with hydrogel.

After the first year, three locations a survival rate of 97–100%, including those plants that were only irrigated with water. These areas have received less than normal precipitation in 2002. It will be interesting to see if water alone will be sufficient to maintain survival. Continued results will be reported in the *2002 Progress Report of Activities*.

## Evaluation of Legumes for High Elevation Mineland Revegetation

For over a decade, the NMPMC has been conducting high elevation revegetation studies at the MolyCorp molybdenum mine in north central New Mexico. This cooperative venture has concentrated on evaluating over 100 native species/ecotypes for survival and growth, as well as developing methods to enhance the establishment of grasses, forbs, shrubs, and trees when planted directly in overburden. As part of this continuing effort, we installed seedling transplants trials in 1996 and 1997 to evaluate commercially available legumes species as well as source-identified legumes on two neutral overburden sites at elevations between 9,000 and 9,500 feet. The capability of including a sustainable nitrogen-fixing legume component in the revegetated plant community is of considerable importance because of the lack of nitrogen in the overburden materials. Earlier studies at the MolyCorp site have shown the critical role of nitrogen fertilization in the vigor and growth of seedling transplants.



**New Mexico Locust Planted On Overburden**

The evaluation plots were located in both xeric situations (lacking appreciable fine-grained overburden and lower precipitation) and mesic situations (more fine-grained overburden and higher precipitation). Two woody legume species proved to be superior performers: New Mexico locust (*Robinia neomexicana*) and false indigo (*Amorpha fruticosa*). The performance of false indigo was unexpected because it is typically found in riparian situations that are several thousand feet lower in elevation than the upland mine sites. The better performing herbaceous legume species in these situations are:

- Native Species on Xeric Sites—purple prairieclover (*Dalea purpurea*), white prairieclover (*Dalea candida*), prairie thermopsis (*Thermopsis rhombifolia*)
- Native Species on Mesic Sites—mountain golden banner (*Thermopsis montana*), northern sweetvetch (*Hedysarum boreale*)
- Introduced Species on Xeric Sites—cicer milkvetch (*Astragalus cicer*)
- Introduced Species on Mesic Sites—alfalfa (*Medicago sativa*), cicer milkvetch (*Astragalus cicer*)

Land managers challenged with stabilizing drastically disturbed sites at high elevations in the Southern Rocky Mountains should consider some of the above species.

### **Bebb's Willow Propagation for Riparian Restoration on the Apache-Sitgreaves National Forests**

The Apache-Sitgreaves National Forests asked for NMPMC assistance in the propagation of Bebb's willow (*Salix bebbiana*) for riparian restoration projects. On the Forest, Bebb's willow inhabits stream corridors and wet meadows at elevations between 7000 and 9500 feet with an average elevation of occurrence of 8800 feet. Although common along many high elevation streams, regenerating stands of the species in wet meadow habitats have declined drastically on many sites in the Forests. In many cases, historic stands of this species have disappeared completely or are evidenced by just a few decadent plants. The decadent condition of many of the mature Bebb's willow stands makes it problematic that seed sources will be available even if other land management practices have improved riparian site conditions sufficiently to allow natural regeneration. Thus, the Forest has a need for plant materials to augment and restore these communities where suitable habitat still remains.

A number of factors may be involved in the decline of Bebb's willow communities on the Forest:

- Grazing by elk and cattle destroying seedlings and young plants as well as reducing the vigor of mature plants.
- Altered watershed function resulting in the lack of flood events that may have been important in creating sediment deposits and moisture conditions conducive to seedling establishment.
- Competition from introduced sod-forming grass species in these wet meadow riparian communities.
- Channel downcutting in the meadows resulting in lowered water tables and the desiccation of previously wet meadows.

An example of riparian restoration efforts on the Forests is the Upper Fairchild Draw project that involved the construction of an 8-foot tall, elk-proof fence to enclose 11 acres of riparian habitat. Based on the presence of a few decadent Bebb's willows and the remains of over 30

dead Bebb's willows, this area was once inhabited by a thriving Bebb's community. The moisture regime still appears to provide suitable habitat for the species although the few remaining Bebb's are all male plants and thus natural regeneration is not possible.

Revegetation is being attempted by planting transplants propagated from cuttings or seed from Bebb's willow stands across the Forest. In March 2001, dormant stem cuttings from younger growth of mature plants were shipped to the NMPMC and vegetatively propagated. In June 2001, seed was collected at another location and sent to NMPMC for cleaning and subsequent seedling production. Seedling transplants in 10 cubic inch containers that had attained a height of 10 to 20 inches were planted out in the Fairchild Draw elk enclosure during November 2001, six months after germination. The following photograph shows one of the plantings sites as well as a decadent Bebb's willow. Additional stock grown from stem cuttings and transplanted into 1-gallon treepots will be planted at the site in spring 2002.



**Fairchild Draw**

These initial studies at Fairchild Draw will help to determine whether grazing control will permit the eventual establishment of vigorous young reproductive trees from these transplants and whether seed from these trees will allow the natural regeneration of Bebb's willow. A similar propagation and reintroduction endeavor on the Apache-Sitgreaves National Forests is planned for 2002 with Arizona willow (*Salix arizonica*), classified as a sensitive species by the US Forest Service, and as a rare species to be highly safeguarded by the State of Arizona Native Plant Law.